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**A61B 34/20; A61B 34/10; A61B 34/30;**  
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**A61B 2034/2055**

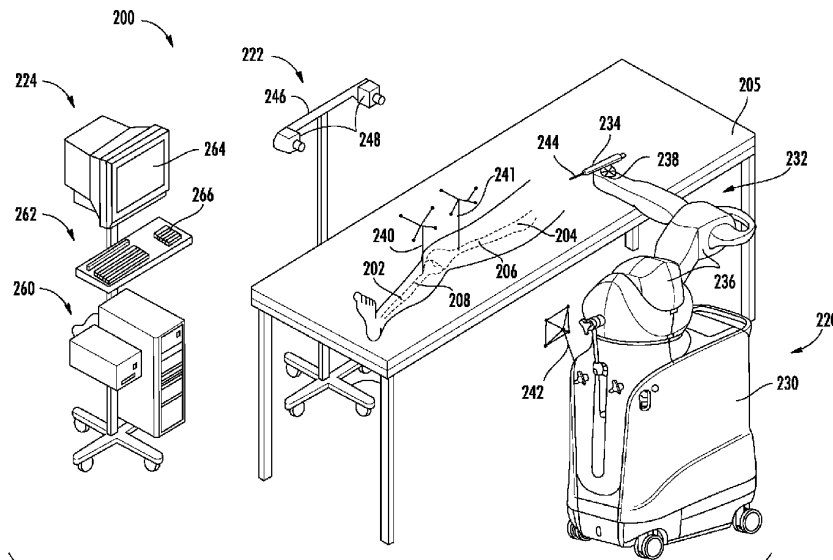
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**19275070.1 / 3 574 862**
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(54) **SYSTEMS AND METHODS FOR ADAPTIVE PLANNING AND CONTROL OF A SURGICAL TOOL**

(57) A surgical system includes a robotic device having a surgical tool, a tracking system, and a processing system communicably coupled to the robotic device. The processing system is configured to store a surgical plan comprising a first planned cut and one or more additional planned cuts, each additional cut defined by a relative angle and distance from the first planned cut, receive tracking data from the tracking system while the surgical

tool makes a cut substantially corresponding to the first planned cut, and determine a recorded first cut plane based on the first tracking data. The processing system is further configured to determine an error between the recorded first cut plane and the planned first cut, the error comprising a deviation from the planned first cut, and update the surgical plan by modifying the one or more additional planned cuts based on the deviation.



**FIG. 2**



**PARTIAL EUROPEAN SEARCH REPORT**

Application Number

under Rule 62a and/or 63 of the European Patent Convention.  
This report shall be considered, for the purposes of subsequent proceedings, as the European search report

**EP 21 18 5161**

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**DOCUMENTS CONSIDERED TO BE RELEVANT**

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2017/340389 A1 (OTTO JASON KARL [US] ET AL) 30 November 2017 (2017-11-30) * paragraph [0151] - paragraph [0162] * * paragraph [0275] * * figures 1,2,13 *	1-6, 12-15	INV. A61B34/20 A61B34/30 A61B34/10
A	US 2017/258526 A1 (LANG PHILIPP K [US]) 14 September 2017 (2017-09-14) * paragraph [0735] - paragraph [0768] * * figures 6-8H *	1-6, 12-15	ADD. A61B17/56
A	US 2016/022374 A1 (HAIDER HANI [US] ET AL) 28 January 2016 (2016-01-28) * paragraph [0828] * * figure 3 *	1,12	
A	US 2008/077158 A1 (HAIDER HANI [US] ET AL) 27 March 2008 (2008-03-27) * the whole document *	1-6, 12-15	
			TECHNICAL FIELDS SEARCHED (IPC)
			A61B
<b>INCOMPLETE SEARCH</b>			
The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC so that only a partial search (R.62a, 63) has been carried out.			
Claims searched completely :			
Claims searched incompletely :			
Claims not searched :			
Reason for the limitation of the search: <b>see sheet C</b>			
Place of search	Date of completion of the search	Examiner	
Munich	16 December 2021	Ebbinghaus, M	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention	
X : particularly relevant if taken alone		E : earlier patent document, but published on, or after the filing date	
Y : particularly relevant if combined with another document of the same category		D : document cited in the application	
A : technological background		L : document cited for other reasons	
O : non-written disclosure			
P : intermediate document		& : member of the same patent family, corresponding document	

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INCOMPLETE SEARCH  
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Claim(s) not searched:

7-11

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Reason for the limitation of the search (non-patentable invention(s)):

The subject-matter of claims 7-11 relates to methods for treatment of the human or animal body by surgery and therefore is excluded from patentability according to Art. 53(c) EPC.

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Independent method claim 7 comprises the step of "recording tracking data indicative of a location of a tool" which data is then used to carry out the subsequent steps. It is clear from the claim and the overall disclosure that the tracking data describes movement of the surgical tool while it carries out a cut on a bone, i.e. while the surgical tool performs a surgical intervention.

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The method as a whole only makes sense if a cut is actually performed by the surgical tool as otherwise no deviation of the actual cut from the planned cut can be determined which renders the updating of the plan impossible.

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In conclusion, claim 7 is considered to imply the presence of a surgical step which is thereby encompassed and renders the whole method surgical. Claims 7 and dependent claims 8-11 which depend on it therefore do not meet the requirements of Art. 53(c) EPC and should be deleted.

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Further limitation of the search

Claim(s) searched incompletely:

1-6, 12-15

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Reason for the limitation of the search:

An incomplete search has been carried out. An invitation pursuant to Rule 63(1) EPC was issued because of severe deficiencies under Art. 76(1) EPC and Art. 53(c) EPC. With the reply dated 08-12-2021, the applicant provided a set of amended claims addressing the raised objections.

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It should be noted that it is not possible at this stage to amend the application documents (Rule 137(1) EPC) so that the amended claims are not formally introduced into the proceedings. However, it appears from the applicant's letter that he wishes to proceed on the basis of these amended claims, the accompanying opinion therefore refers to them instead of the claims as originally filed.

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As stipulated under Rule 63(2) EPC, the European Patent Office has drawn up a partial search report based on amended claims 1-6 and 12-15 as filed on 08-12-2021.

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Future amendments to the claims may only be based on subject matter that has been searched (Rule 137(5) EPC), i.e. subject matter that is contained within the figures and passages in the description that were indicated by the applicant.

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ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

16-12-2021

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